

CLAIMS

What the invention claimed is:

1. A method of cleaning a dynamic device, comprising the steps of:
providing a steam source;
providing a surfactant source;
providing a solvent source;
delivering steam from said steam source to said device;
removing vaporous effluent from said device while steam is delivered to the vessel;
introducing a solvent from said solvent source into the steam delivered;
introducing a surfactant from said surfactant source into the steam delivered to the device; and
activating the device for a period of time when one or both of said solvent and surfactant are being delivered.
2. The method of claim 1 including the additional step of preheating the device to a minimum temperature with said steam prior to the induction of the solvent and surfactant.
3. The method of claim 1 wherein the surfactant comprises a linear alcohol ethoxylate (C12 – C15) with an ethoxylated propoxylated end cap and a fatty alkanolamide.
4. The method of claim 1 wherein said surfactant comprises at least one of nonylphenol polyethoxylate, a straight chain linear alcohol ethoxylate, a linear alcohol

ethoxylate with block copolymers of ethylene and propylene oxide, an oleamide DEA, and diethanolamine.

5. The method of claim 1 wherein the solvent is organic.
6. The method of claim 5 wherein the solvent comprises a terpene.
7. The method of claim 6 wherein said terpene is a monocyclic saturated terpene.
8. The method of claim 7 wherein said terpene is para-menthane.
9. The method of claim 6 wherein said terpene is a monocyclic unsaturated isoprenoid.
10. The method of claim 6 wherein said terpene is a bicyclic pine terpene.
11. The method of claim 1 wherein the surfactant and solvent are introduced into said steam by joining said steam, surfactant, and solvent sources.
12. The method of claim 11 wherein said joining is accomplished using a T-fitting.
13. The method of claim 1 wherein said device is a pump.

14. The method of claim 1 wherein said device is identified for maintenance using vibration analysis.
15. A method of cleaning the internal surfaces of a device in a refinery comprising the steps of:
- selecting a device through which processing fluids normally flow in a first direction; and
 - directing cleaner through said device in a direction opposite said first direction.
16. The method of claim 15, comprising:
- temporarily activating the device while said cleaner is being directed.
17. A method of removing contaminants from the metal surfaces of a dynamic device in a refinery, comprising the steps of:
- administering cleaner to the internal surfaces of the device;
 - activating the device.
18. The method of claim 17 further comprising:
- including a surfactant and a solvent in said cleaner.
19. The method of claim 17, comprising:
- using steam to deliver said cleaner to said internal surfaces of said device.
20. The method of claim 17, comprising:
- removing vaporous effluent from said device while steam is delivered to the vessel;

introducing a solvent from said solvent source into the steam delivered;
introducing a surfactant from said surfactant source into the steam delivered
to the device; and
activating the device for a period of time when one or both of said solvent
and surfactant are being delivered.